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ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: 123

DATE: Monday, August 14th, 1989

BEFORE: M.I. JEFFERY, Q.C., Chairman
E. MARTEL, Member
A. KOVEN, Member

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EA-87-02

HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental Assessment for Timber Management on Crown Lands in Ontario;

- and -

IN THE MATTER OF a Notice by the Honourable Jim Bradley, Minister of the Environment, requiring the Environmental Assessment Board to hold a hearing with respect to a Class Environmental Assessment (No. NR-AA-30) of an undertaking by the Ministry of Natural Resources for the activity of timber management on Crown Lands in Ontario.

Hearing held at the Ramada Prince Arthur Hotel, 17 North Cumberland St., Thunder Bay, Ontario, on Monday, August 14th, 1989, commencing at 1:00 p.m.

VOLUME 123

BEFORE:

MR. MICHAEL I. JEFFERY, Q.C.	Chairman
MR. ELIE MARTEL	Member
MRS. ANNE KOVEN	Member

A P P E A R A N C E S

MR. V. FREIDIN, Q.C.) MS. C. BLASTORAH) MS. K. MURPHY) MS. Y. HERSCHER)	MINISTRY OF NATURAL RESOURCES
MR. B. CAMPBELL) MS. J. SEABORN)	MINISTRY OF ENVIRONMENT
MR. R. TUER, Q.C.) MR. R. COSMAN) MS. E. CRONK) MR. P.R. CASSIDY)	ONTARIO FOREST INDUSTRY ASSOCIATION and ONTARIO LUMBER MANUFACTURERS' ASSOCIATION
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MR. J.F. CASTRILLI) MS. M. SWENARCHUK) MR. R. LINDGREN)	FORESTS FOR TOMORROW
MR. P. SANFORD) MS. L. NICHOLLS) MR. D. WOOD)	KIMBERLY-CLARK OF CANADA LIMITED and SPRUCE FALLS POWER & PAPER COMPANY
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MR. R. EDWARDS) MR. B. McKERCHER)	NORTHERN ONTARIO TOURIST OUTFITTERS ASSOCIATION

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MR. J.W. ERICKSON, Q.C.) MR. B. BABCOCK)	RED LAKE-EAR FALLS JOINT MUNICIPAL COMMITTEE
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MR. J.W. HARBELL) MR. S.M. MAKUCH)	GREAT LAKES FOREST
MR. J. EBBS	ONTARIO PROFESSIONAL FORESTERS ASSOCIATION
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I N D E X O F P R O C E E D I N G S

I N D E X O F E X H I B I T S

Index of Exhibits (Cont'd)

---Upon commencing at 1:25 p.m.

THE CHAIRMAN: Thank you, ladies and gentlemen. Be seated, please.

Well, as you are probably aware, we have had an interesting morning in terms of trying to plot the logistics of this hearing for this week and also next week.

As many of you have heard, unfortunately we have some problems with the scheduling for the following week and it appears that we are going to have to adjourn the hearing for all of next week. So that what we are going to attempt to do, and we were going to attempt to do that before we heard about Dr. Ritter's most recent problems, is sit all afternoon, perhaps take a bit of a break and then sit a little while into the evening tonight.

What has now happened, unfortunately, is Dr. Ritter's plane evidently had some kind of hydraulic problem and did not land in Thunder Bay, but rather landed in Winnipeg, and he will not be returning to Thunder Bay until around five o'clock this afternoon.

So the Board's suggestion is, is that we all obviously adjourn for the afternoon, and those of you who can perhaps sleep in the afternoon do so, and we will commence sitting tonight at 7:00 p.m. and sit

for a few hours tonight.

Everybody is being apprised of this, except Mr. Castrilli who will be the star performer tonight.

MS. MURPHY: I think he is aware of it and we have been discussing perhaps sitting tonight.

THE CHAIRMAN: Okay. And I had spoken with Mr. Castrilli earlier and indicated that there may be an evening session and he was agreeable at that time, so presumably he will just start tonight at 7:00.

I take it this isn't a problem for the reporters?

COURT REPORTER: No.

THE CHAIRMAN: Okay. Then commencing tomorrow, and we will see how far we get tonight, we are going to try and sit some reasonably long hours this week. Perhaps tomorrow we may not start at 8:30 because of going later this evening, but if we started at 9:00 we would probably sit until six o'clock or thereabouts and make it a fairly full day.

The same for Wednesday, and we are suggesting that we sit all day Thursday and, based on the estimations given by counsel last week, we may finish off this panel by late Thursday in time to get out Thursday evening.

In the event that we didn't, we are canvassing the idea of possibly sitting Friday morning and being able to leave Thunder Bay on the 11:45 plane in the morning. That would be an early start Friday morning as well, eight o'clock or something like that, and try and get in two or three hours, if that's all we had left to finish the panel. But it may not come to that, based on the estimates of time given by counsel.

Then we would have to postpone for the following week, firstly, the return to the cross-examination of Panel 14; and, secondly, the scoping session which we had scheduled for next week as well, but since we are going to be losing a little bit of time next week, we will put the scoping session off to the following week.

---Discussion off the record

THE CHAIRMAN: We had scheduled to sit on the 28th, which is the Monday, and we were just discussing that if, for some reason, we didn't finish Dr. Ritter or this panel this week then - and we can't confer with him at this time - there may be a possibility of finishing off the panel that one day.

What about you, Mr. Kingsbury, on the 28th if we had to come back that day; is that possible?

MR. KINGSBURY: That's possible.

THE CHAIRMAN: Okay. And that would most certainly end this panel on the pesticides issues.

We would then immediately commence with the cross-examination of Panel 14, but we would also want to hold the scoping session for 15 as early as possible that week, and I think what we will end up doing is, we will schedule that date definitely for either the 28th or 29th towards the end of this week as soon as we find out what happens with this panel, whether or not we are going to finish.

MS. SEABORN: Mr. Chairman, perhaps with respect to the scoping the Board might consider holding it in the evening or at the end of the day so it wouldn't involve the witnesses.

I know from our side, we would like to have a fixed date on that in case other counsel are interested in attending.

THE CHAIRMAN: Okay. Then why don't we -- if that's agreeable to everybody, why don't we schedule the scoping for Monday evening on the 28th. Okay, so that will be Monday the 28th for the scoping session of Panel 15.

Are there any other preliminary matters we should be dealing with at this time while we have people here?

MR. EDWARDS: Could I have a time on that, Mr. Chairman, please?

THE CHAIRMAN: For the scoping session?

MR. EDWARDS: Yes.

THE CHAIRMAN: I suppose we should -- well, it sort of depends on when we finish that day. If we finish with the witnesses, if it were a carry-over of this panel, it could be late in the afternoon, but if it would make it easier for counsel perhaps we could just set seven o'clock or 7:30 that evening.

MR. EDWARDS: That date would be much easier if we could fix an evening time for me.

THE CHAIRMAN: Okay. We will sit at seven o'clock that evening. And, again, given the past scoping sessions it shouldn't last more than an hour, an hour and a half at the outside.

Anything else to deal with at this time?

(no response)

Very well. We will adjourn until seven o'clock this evening. Thank you.

---Adjournment taken at 1:35 p.m.

---On resuming at 7:10 p.m.

THE CHAIRMAN: Well, good evening everyone for the second time today.

Dr. Ritter, I trust you made an uneventful landing in Thunder Bay ultimately.

DR. RITTER: Yes, sir. You could perhaps assist me in determining the extent of damages to which I'm entitled from Canadian Airlines?

THE CHAIRMAN: Well, there is lots of counsel here who would probably take the case.

MS. CRONK: Don't go low.

MR. CASTRILLI: Mr. Chairman, just for the benefit of all parties, I had previously given a list of exhibits for this cross-examination. I just wanted to identify the ones that predate this last week that I will be relying on over the next several days. Exhibit --

THE CHAIRMAN: Several days?

MR. CASTRILLI: Yes. Exhibit 603A, 604A, 604C, Exhibit 4, Exhibit 668 and Exhibit 671, plus the exhibits that commence from Exhibit 707.

THE CHAIRMAN: Thank you.

PETER KINGSBURY,
LEONARD RITTER, Resumed

CROSS-EXAMINATION BY MR. CASTRILLI:

Q. Dr. Ritter, welcome to night court. I would like to begin with Exhibit 709.

DR. RITTER: A. I wonder if you could

identify that for me.

Q. Sorry, that would be your exhibit which I believe is the series of hard copy of the overheads.

A. Thank you, I have it.

Q. We are actually looking at what would be pages I and J for that exhibit, the last two pages. Do you have those pages?

A. Yes, I do.

Q. Now, as part of your evidence last week you referred to the process for risk estimation with respect to both food and worker exposure from pesticides and I take it that's what pages I and J are with respect to; is that right?

A. That's correct.

MS. MURPHY: Excuse me, is your microphone on?

DR. RITTER: Yes, it is.

MR. CASTRILLI: Q. And these are part of the calculations for determining either acceptable daily exposure or acceptable daily intake and, with respect to that, a safety factor is used; is that correct?

DR. RITTER: A. That's correct.

Q. And can you just confirm for the

record that the safety factor approach is not used when estimating risks from pesticides thought to be capable of causing cancer?

A. If I understand your question, are you asking that the safety factor approach is not used by us or not used in general, or if you could just clarify that for me?

Q. Not used by Health and Welfare Canada.

A. As a matter of routine, no.

MRS. KOVEN: Excuse me, was that for carcinogens only?

DR. RITTER: That's correct. I should add, Mr. Castrilli, perhaps just as a matter of clarification, the estimates that I provided for food -- for estimating risks from the food route, I provided as a matter of information.

As I know you are aware, and perhaps others here are not, my primary responsibilities relate to occupational health rather than to food intake. So I provided this in the context of completeness rather than absolute accuracy, if you like.

MR. CASTRILLI: All right. That's fine, thank you.

Q. Now, I recall your testimony with

respect to toxicology studies was to the effect that the situation in Canada is pre-market?

DR. RITTER: A. That's correct.

Q. All the toxicology studies you refer to, which are also listed in Exhibit 709, must be carried out prior to registration in Canada; is that correct?

A. That's the present scheme, that's correct.

Q. And perhaps I could just refer you to what would be page E of that exhibit.

A. Yes.

Q. Leaving aside the last listed series of tests, worker exposure for the moment, and just focusing on the other six categories which are long-term and special tests?

A. Yes.

Q. Generally, would it be fair to say that these studies would not be done by companies for Canada alone but for --

A. Yes.

Q. Sorry, your answer is yes?

A. Yes.

Q. And they would be done for several countries at the same time?

A. Yes.

Q. Would it be fair to say that, generally speaking, for a particular pesticide all countries would generally get the same long-term studies from a particular applicant?

A. That's difficult for me to say. Certainly the United States would receive the same studies but, in many countries around the world, these registration requirements are not in place.

Q. That's fine. Just with respect to the United States and Canada then, your answer is that certainly Canada and the U.S. would have the same long-term studies from a company seeking registration; is that correct?

A. Yes.

THE CHAIRMAN: Dr. Ritter, why wouldn't worker exposure studies also be conducted on the basis of other countries, not just Canada?

DR. RITTER: I'm not sure I understand the context of your question.

THE CHAIRMAN: I think Mr. Castrilli's question was for the first six categories of studies, not the last--

DR. RITTER: Yes.

THE CHAIRMAN: --indicating are those

studies that are carried on simultaneously in other countries, and would the data from those studies be used by Canada and the U.S.?

DR. RITTER: Yes.

THE CHAIRMAN: Why would the last category not also fall into that category.

DR. RITTER: The last category would.

THE CHAIRMAN: It would.

DR. RITTER: Mr. Castrilli's question was ignoring the worker studies for the moment. The other studies would, so on and so forth. But certainly where exposure --

THE CHAIRMAN: Your answer would apply to worker exposure studies as well?

DR. RITTER: Where it is available and relevant. Because the worker expsosure studies -- the utility of the data will be determined in part by the method of application and a number of variables specific to the country of use, they are not necessarily universally applicable to all jurisdictions. But certainly if available they are almost always submitted.

THE CHAIRMAN: Okay.

MR. CASTRILLI: Q. Dr. Ritter, I can presume a great cooperation and communication between

the Health Protection Branch and the United States Environmental Protection Agency with respect to knowing that each country has the same long-term studies?

DR. RITTER: A. No, I don't think I would presume that. I think we endeavour to cooperate as much as we can but the Americans, as you know, are very, very sensitive about protection of data and the extent and degree of cooperation I think has been a matter of up and down really.

Q. Well, let me just ask you then: If there was a data gap with respect to a long-term study for a particular pesticide, is it likely that Canada and the U.S. would have the same data gap?

A. You're talking about a study missing completely?

Q. Yes.

A. Probably, yes.

Q. Thank you. Now, actually this question really is put in a way, I would like an answer from both Mr. Kingsbury and Dr. Ritter.

I understand your testimony to be that federal law and, in particular, the Pest Control Products Act ensures that all pesticides registered and approved for use in timber management have been tested and are judged not to impose an environmental or human

health hazard?

A. That is my understanding of the legislation but, as you are aware, I am not with the department that ultimately sets the regulations for registration of pesticides. My own view is that what you have just said is correct.

Q. Mr. Kingsbury, in relation to environmental risk?

MR. KINGSBURY: A. I guess we -- I think that I would basically agree, although it depends on how one defines what posing a hazard might mean. Certainly there has to be some judgment in that process.

We know that all of these pesticides pose a hazard to certain target organisms and organisms that are closely related to them. I wouldn't say that there is no hazard involved, but they certainly have been scrutinized and evaluated for that hazard and it has been judged to be an acceptable hazard.

Q. Can I ask you to refer to Exhibit 4. Sorry, that would be the Environmental Assessment Document.

MS. MURPHY: Well, just for the witnesses, I have put a copy of that document over on the corner and I'm not sure if they have had an

opportunity to review that entire document.

MR. KINGSBURY: That's this?

MR. CASTRILLI: Q. I'm referring to page 32.

DR. RITTER: A. We're with you.

Q. Lines 10 to 15. Perhaps you could read them to yourselves and then tell me whether you both agree with the statement?

DR. RITTER: A. I would certainly concur with the initial part of the statement, the Federal Pest Control Products Act. I feel less comfortable agreeing with another statute with which I am really not familiar. I'm not really sure what the Ontario Pesticides Act is designed to do.

Q. I'm sorry,, for the purposes of the question, just focus on the federal statute that I know you are familiar with.

A. Yes, it's my impression that that Act intends to impart that sense.

MR. KINGSBURY: A. Yes, I would concur in that it speaks about placing a judgment call on the hazard.

Q. Fine. Dr. Ritter, continuing with really Exhibit 709, the overhead -- or the hard copy of the overhead we have been looking at, but also I think

at the same time keeping in mind your evidence in what is Exhibit 603A, which I think basically restates that, in particular pages 87 and 88.

MS. BLASTORAH: (handed)

DR. RITTER: I'm sorry, go ahead.

MR. CASTRILLI: Q. Pages 87 and 88 and also pages 90 through 92 essentially describe and list the studies that you have reproduced in your Exhibit 709?

DR. RITTER: A. That's correct.

Q. And you have outlined that these are the -- this is the type of information that must be provided for consideration of a new pesticide; is that right?

A. That's correct.

Q. And this part of your evidence really describes the requirements for pesticides today; is that right?

A. That's correct.

Q. Would it be fair to say that these requirements have evolved over time?

A. Yes.

Q. I believe in your evidence you indicated last week that precise point, the data requirements have changed over the years. Do you

recall that testimony?

A. Yes, I do.

Q. Requirements today are more sophisticated than they might be even five -- might have been even five years ago?

A. With regards to the human health aspects, I think the only notable change has been the entrenchment of worker exposure studies as a requirement. Other than that, I think they have stayed more or less the same for the last seven or eight or nine years.

Q. Were the information and testing requirements you describe in your written evidence, Exhibit 709 and 603A, in effect in Canada in the 1940s and 1950s?

A. No, they were not.

Q. And, as you know, that was at a time when the product 2,4-D was first registered in Canada; is that right?

A. Yes, it is.

Q. So your written evidence does not describe the testing regime that first registered 2,4-D; is that right?

A. That's correct. Yes, that's correct.

Q. Thank you. Were the information

requirements you describe in your written evidence in effect in Canada in the mid to late 1960s when simazine was first used operationally for Ontario forest management?

A. I don't think the requirements, as I have described, them were in place in the mid-60s. I think they were more ambitious than they were at the time when 2,4-D may have been registered, but I do not believe they would have been quite as ambitious as we've described here for the present situation.

Q. Thank you. Perhaps for the record I should ask you to explain what you mean by not quite so ambitious?

A. The list of studies which we currently require, although I could not be absolutely certain, I would be surprised to learn that those data requirements were in place in the mid-60s. I would suspect that there were lesser requirements in place in the mid-60s.

Q. Mr. Kingsbury, can you confirm for me that a herbicide is seldom used -- excuse me, is seldom sold for use as the pure chemical?

MR. KINGSBURY: A. I'm not familiar with all herbicide products marketed, primarily with forestry ones, but I would tend to agree with that

statement. There may be exceptions in some use patterns.

Q. I will refer you to Exhibit 603 again, page 203.

A. I have it.

Q. At the bottom of the page, the last full sentence on the page:

"A herbicide is seldom sold for use as the pure chemical."

Do you have agree with that statement?

A. Yes, I would.

Q. I gather it is normally mixed with several inert ingredients?

A. Depending on the pesticide there can be a number of other ingredients in a manufacturer's product which would be there for a specific purpose. That tends to be true of the vast majority of pesticides, depending on whether there is a need to stabilize, preserve, help the product to disperse, or be disseminated in the environment.

Q. Just turning the page of that exhibit to page 204.

A. Yes, I have it.

Q. Do you agree that the combination of pure chemical, which is known as the active ingredient,

plus the inert ingredients is referred to as the product? Do you agree with that?

A. Yes.

Q. Dr. Ritter, can you confirm for me that acute toxicity tests required for registration in Canada are performed on the active ingredient and the product?

DR. RITTER: A. Yes, that's correct.

THE CHAIRMAN: Was that "and the product" or "in the product"?

MR. CASTRILLI: And the product.

Q. And just for the record, Dr. Ritter, the active ingredient is that part of the product which is designed to control a particular pest; is that right?

DR. RITTER: A. Yes. We tend to think of the active ingredient as that component for which the guarantee of efficacy is expressed.

Q. Okay. So active means toxicologically active in relation to the pest?

A. That's correct.

Q. Sometimes also known as pesticidally active?

A. Yes.

Q. Dr. Ritter, can you also confirm for

me that long-term and special tests required for registration in Canada are performed on the active ingredient only?

A. Yes.

Q. And those are the tests we were referring to earlier in Exhibit 709?

A. That's correct.

MR. CASTRILLI: Just for the record, Mr. Chairman, those would be found at Exhibit 709, page E.

DR. RITTER: With the exception, I might add, of the worker exposure study. Those are typically done on product.

MR. CASTRILLI: Q. That's fine. The top six on that page. Your answer is yes?

DR. RITTER: A. Yes.

Q. Gentlemen, in my client's Exhibit 671 we asked the Ministry of Natural Resources to provide us with a list of all inert ingredients used with all active ingredients that are proposed for use by the Ministry within the area of the undertaking.

MR. KINGSBURY: A. Excuse me, could you identify that exhibit by tab, please?

Q. Sorry, 671.

A. And the title of it is?

Q. It's a list of interrogatories we

filed.

A. For Panel 12?

Q. For Panel 12.

MS. MURPHY: Perhaps it might be easier for the witnesses if you refer them to the question.

MR. CASTRILLI: It's the last page, it's Question 21.

MS. MURPHY: It would probably be easier for them.

MR. CASTRILLI: Q. Perhaps you can just take a moment to read it.

DR. RITTER: A. Yes.

Q. We asked you to provide a list of all the inert ingredients used with the herbicides that are proposed for use by the Ministry within the area of the undertaking.

Your answer -- or not your answer, but the Ministry's answer was, they were not aware of the identity of the inert ingredients in the herbicide products which they propose to use.

They went on to state why, which was that this is proprietary information which can only be obtained from the manufacturer or from the pesticide division of Agriculture Canada.

A similar answer, gentlemen - and you

need not refer to it - was given in Exhibit 668, the last page again, and that was in relation to insecticides, just for the record.

Dr. Ritter, would it be fair to say that while inerts may be pesticidally inert some are not necessarily toxicologically or biologically inert?

A. Yes, that's correct.

Q. Your answer was...?

A. Yes.

Q. You were competing with the street again.

Would you agree, Dr. Ritter, that if some inerts are in fact toxicologically active, then the lack of long-term testing on some of them may be a problem?

MS. MURPHY: Assuming that it is.

MR. CASTRILLI: Yes, I said if.

DR. RITTER: I'm not sure I understand your question. If -- I wonder if I could just ask you to restate that perhaps a little differently.

MR. CASTRILLI: Q. Sure, I would be pleased to. Would you agree that if some inerts are in fact toxicologically active, then the lack of long-term testing on -- I said them, I meant inerts?

DR. RITTER: A. Yes.

Q. But I could also have said the full product, which will be the active plus the inerts, is a problem or may pose a problem?

A. Well, may pose a problem I think is, strictly speaking, correct but there is, of course, some logic in Canada and in the United States behind the lack of requirement, if you like, of testing the entire product in this longer list of long-term and special tests that we've referred to, page E in Exhibit 709. We can pursue those, if you like.

Q. Well, let me ask you the next question, maybe you can pursue it through the next question.

When I said problem, I meant it in the sense that long-term testing on just the active ingredient will not be giving a true picture of the potential long-term problem posed by the fully formulated product to health and the environment?

A. That's possible.

THE CHAIRMAN: Well, do you want to go on and explain why you do it that way?

DR. RITTER: Yes. There are really two facets to the generation of these data requirements in terms of the active ingredient alone and the product containing both the active and the so-called non-active

components.

One is that formulations differ not only from national jurisdiction to national jurisdiction, but indeed within one national jurisdiction.

If we were to look at, for example 2,4-D formulations which is of interest to this hearing, there are many 2,4-D formulations registered for use in Canada, I believe somewhere in the order of about 40 different products.

The idea or the prospect of actually testing each one of these 40 individually in the full battery of studies that are required, strictly from a feasibility point of view is not possible. There are not enough testing facilities in the world to carry out that extent of testing which would be required.

Bear in mind that of approximately 450 active ingredients registered in Canada for all uses, that translates to almost 5,000 products. So it would increase the testing burden roughly by a factor of 10.

Secondly, many of the components which are used in pesticide formulations are not -- many of the components, other than the active ingredient, are not unique to pesticide formulations. In fact, I don't think I can think of a single example where the non-active component is unique to pesticide

formulations.

So that the biological imperative in developing these testing schemes is really to subject that component to which one's exposure will be uniquely from the pesticide to the most rigorous kind of testing. And, in that way, in fact what we have done is we have created a testing scheme for pesticides which is far more agressive than it is for any other industrial chemical that I know of and much closer aligned to the kinds of studies that we require for human drugs notwithstanding, of course, the absence of human clinical trials, bearing in mind that drugs are, of course, agents which are intended for direct human application for therapeutic purposes and contact with pesticides, of course, to be avoided.

So that in our view, at least both nationally and internationally, that logic I think has served the public health interest well and has not really served to expose anyone to any chemicals which are untested to which their exposure is not already many fold greater through other venues.

MR. CASTRILLI: Q. I see. Are you aware that the U.S. Environmental Protection Agency has identified approximately 50 inert ingredients as being significant -- being of significant toxicological

concern?

DR. RITTER: A. They publish a list periodically, I'm familiar with the list. If that is what you are referring to, yes.

Q. Dr. Ritter I have provided you with that list; is that correct?

A. Yes, you have.

Q. But I can take it that you are familiar with the list in any event in your capacity as Chief of Pesticide Division for Health and Welfare Canada?

A. I'm familiar with the list.

Q. All right.

MR. CASTRILLI: Mr. Chairman, I would like to make this the first of my exhibits.

THE CHAIRMAN: Very well. Exhibit 725.

---EXHIBIT NO. 725: Policy statement of U.S. EPA on inert ingredients in pesticide products, dated Wednesday, April 22, 1987 from U.S. Federal Register.

MR. CASTRILLI: Q. Dr. Ritter, do you have a copy handy, or I can provide one?

DR. RITTER: A. If you have one handy, I will take it. I do have one. Thank you.

MR. CASTRILLI: Mr. Chairman, for the record, this exhibit is entitled -- well, it's from the

Federal Register of the United States, it's a policy statement by the United States Environmental Protection Agency on inert ingredients in pesticide products and it's dated Wednesday, April 22, 1987. It's a federal registered notice. (handed)

THE CHAIRMAN: Thank you.

MR. CASTRILLI: Q. All right. Dr. Ritter, if I could refer you to page 13 -- excuse me, 13306, it would be the second page of this exhibit.

DR. RITTER: A. Yes.

Q. You see at the bottom that the U.S. EPA as of April, 1987 had identified really four categories. I'm just going to refer to these and deal with them one at a time, or several of them one at a time.

The first one is inerts of toxicological concern which is listed at the bottom of that page in the first lower part of the first column.

And, Dr. Ritter, can you confirm for me that the criteria established by the U.S. EPA for the placement of an inert product in this list included the following: Carcinogenicity, adverse reproductive effects, neurotoxicity or other chronic effects, birth defects, documented ecological effects, and potential for bio-accumulation. Is that right?

A. You are essentially paraphrasing the middle paragraph on the top of page 06?

Q. Yes, that's right. And you agree those are the criteria for placement of the products that are listed in the list 1?

A. I would agree that EPA have indicated that those were the criteria that they utilized, yes.

Q. Were you aware of this list or the criteria?

A. Yes.

Q. Are you also aware that the U.S. EPA has identified another 60 inert ingredients as being potentially toxic and should be assessed for effects, that would be list 2 on the same page?

A. Yes.

Q. Your answer is yes?

A. Yes.

Q. Are you also aware that the U.S. EPA has identified a third category of inerts numbering approximately 800 for which the agency indicates:

"These inerts are of unknown toxicity."

A. Yes.

Q. Dr. Ritter, does the Canadian government have a list or lists of toxic or potentially toxic inert ingredients for pesticides registered in

Canada?

A. Not as formally organized as this list is before you, no.

Q. Would it be of any difficulty in formalizing the list and making it available to these proceedings?

A. It would be difficult only in that it's not done. It would be not an insignificant undertaking to try to formalize that list and make it available. It's simply ad hoc, there isn't something I can readily access and make available.

Q. Can you just tell me: Does the Canadian government, National Health and Welfare or yourself know what the inerts are that are found in the nine pesticides that MNR proposes to use on Ontario's crown forests?

A. I would think we are aware of the inert component of those pesticides, yes.

Q. Is that a list you could provide to this Board?

A. The list, as indicated in the answer I think provided to you by MNR in the interrogatory, the list of components in a formulation are generally considered proprietary. I can't --

Q. The list of the inerts is considered

proprietary?

A. The list of components of the formulation is considered proprietary. I can't really answer your question as to whether or not I can make that available or not, that is a matter of law and, as I indicated earlier, I really refer that to counsel.

MS. MURPHY: As we discussed earlier, Mr. Chairman, we did point out that if there was an inquiry of this nature, it should have been by notice.

I was pointing out that we had pointed out earlier that if there was to be an inquiry of this nature that it should be done at least on notice to those persons who claim to own that information.

MR. CASTRILLI: Well, can we leave it that this tribunal does not know what the inerts are.

Q. Dr. Ritter?

DR. RITTER: A. I have no answer to that.

Q. Dr. Ritter, I can tell you the tribunal does not know what the inerts are.

MS. CRONK: Then why ask the question?

DR. RITTER: Well then, you are answering the question.

I don't know what the tribunal knows. I know that I know what the inerts are, or at least I

have access to that information and, in attempting to answer your question, I think I have tried to indicate that I can't answer your question as to whether or not I can make that list available. It's a matter of law not opinion.

THE CHAIRMAN: Mr. Castrilli, I think you can assume that we don't know what they are either.

MR. CASTRILLI: That's fine.

Q. If that's the case, would you agree with me, Dr. Ritter, that a decision-maker or anybody for that matter reading Exhibit 4, which was the Environmental Assessment, page 32, cannot have full confidence that all pesticides registered for use in timber management have been tested and do not impose an environmental or human healthy hazard?

DR. RITTER: A. No, I would not agree with that.

Q. No. And that is because you know what the inerts are and are satisfied that they are inert, but nobody else does?

A. No. The basis for making a judgment as to whether or not the products can be used safely is based on an interpretation of the information that is available.

The way the statute is structured in

Canada, the primary responsibility for that evaluation is with the Department of National Health and Welfare. It's a similar organizational scheme within the United States.

Having carried out the evaluations that we have, various provincial regulatory agencies are prepared to defer to that judgment and, in the case of the products being used in Ontario for forestry, that is exactly what has happened.

I think the provincial regulatory agency in this case can have every confidence.

THE CHAIRMAN: Well, let's -- before we get into this whole area, Mr. Castrilli, let's sort of set some boundaries.

As we understand it, Dr. Ritter, the data that is submitted by the companies contain components of their formulations which obviously would be made up of both active ingredients and inert ingredients and Health and Welfare has access to all of this information in deciding whether or not to afford the product registration status; is that correct?

DR. RITTER: Yes, it is.

THE CHAIRMAN: The fact that we don't have it before us at this point in time, or up to this point in the proceedings, doesn't take away from the

fact that Health and Welfare, in exercising its role pursuant to the legislation, the Pest Control Products Act, has access to that information?

DR. RITTER: That's correct.

THE CHAIRMAN: And it is your view, whether or not it's a legal view, that those formulations comprise proprietary property on the part of the formulator of the product and that may -- may or may not be subject to being divulged--

DR. RITTER: That's right.

THE CHAIRMAN: --in accordance with how that proprietary information is determined to be available as a matter of law.

DR. RITTER: Yes.

THE CHAIRMAN: So, Mr. Castrilli, at this point in time we may not have the information. There may be a question as to whether we can require that information and whether it is a matter which can be divulged before this tribunal, I think that would be a legal argument to start off with, and I think the Board agrees with Ms. Murphy that if there is going to be such an argument, then the owners or purported owners of that proprietary information must be apprised so that they can at least be part of the discussion as to whether or not this Board will require that

information.

But I guess we get into a more important question at this point in the proceedings as to: Why should we have that information?

MR. CASTRILLI: Is that a question for me?

THE CHAIRMAN: Yes.

MR. CASTRILLI: If we don't know what the toxicological significance may be of the inert ingredients, Mr. Chairman, then I would suggest to you that it is difficult to accept the proposition put forward on page 32 of the Environmental Assessment or, indeed, in any place else that have been made by these gentlemen in the evidence they have given in the last four days.

We simply do not know what the toxicological significance is of the products that are being sprayed because you do not know what the inerts are. It seems to me fundamentally you cannot accept the statements at page 32.

MR. KINGSBURY: If I may clarify. I believe you will find in my direct evidence I testified that in terms of the field testing that is carried out prior to registration for forestry use that in fact the product, as you have defined it, is tested under

maximum application rates.

And I think that that needs to be clarified, that we do test the product in the field for the environmental toxicology package that applies to forestry registration.

MR. CASTRILLI: Mr. Chairman, I was speaking in particular of the long-term tests that are referred to by Dr. Ritter in Exhibit 709 and also in Exhibit 603A. That's a statement with respect to health and it's a statement with respect to the testing that has been done.

And we do not know and, as far as I can tell, Dr. Ritter has advised that you do not do long-term testing on the product, you do it on the active not the inert.

So it seems to me you are in a quandary with respect to the assertions that the products have been tested when it's clear that they have not and you do not know, in any event, what the toxicological significance of the inerts are because you do not know what the inerts are.

And I have just provided to you a list which is now Exhibit 725 which lists 50 significant inerts with respect to toxicology, another 60 with respect to potential significance with respect to

toxicology, and a further 800 with respect to unknown toxicity. It seems to me --

THE CHAIRMAN: But these aren't listed, these ingredients - and I haven't read this exhibit obviously, I just got it - but these ingredients which set out in the four categories the various inerts, are not dealt with here in terms of their formulation; are they, these are just lists of inert chemicals?

MR. CASTRILLI: That are found in pesticides.

THE CHAIRMAN: That are found in pesticides, but it doesn't tell you in what quantity or with what active ingredient these particular inerts are found in terms of a particular product?

MR. CASTRILLI: That's correct.

DR. RITTER: That's correct.

MRS. KOVEN: But, on the other hand, it wouldn't be an exhaustive list either.

DR. RITTER: No, it wouldn't be an exhaustive list, but I think there's another point to be made here, if I may, and that's, I attempted a moment ago in answering Mr. Castrilli's question to point out that, in our attempt to provide greatest efficiency for dollars spent, if you like, the idea is to test as much as we can of that component to which

you are most likely to be exposed most often.

In the case of the active component, the pesticidal component, your only opportunity for exposure to that component is through the pesticide application. In the case of the non-active ingredient, your exposure to the other components will be relatively trivial in the vast majority of cases from the pesticide formulation as compared to all other exposures which one may encounter in the course of day-to-day life.

I would ask you to note, for example, that in the EPA Document which Mr. Castrilli has submitted, on the left-hand column in the middle of the second page it says:

> "There are currently approximately 1,200 inert ingredients in pesticide formulations but half of these have been cleared for food use."

So as many as 600 of the 1,200 on the food list have been are actually food grade additives.

The point that I am trying to make is that if they are in the food which you are consuming every day in the general population, the contribution that exposure through a forestry pesticide application is likely to make is going to be relatively trivial

comparatively speaking.

MR. MARTEL: But could you be exposed to these inerts in another fashion other than just the exposure to the pesticide? Could you encounter them in some other way which could contribute and have a cumulative effect?

DR. RITTER: Yes. In fact, half of these are in the food you are eating.

MR. MARTEL: Yes, but there is the other half which is 600 also.

DR. RITTER: Yes.

MR. MARTEL: I mean, we are not dealing with small sums, we are dealing with large numbers. What are the other -- what are the other 600 that aren't in the food and what is the exposure to those?

DR. RITTER: I think you will find that if you were to examine a list of so-called inert ingredients, non-active ingredients, which are used in Canadian pesticide formulations not only those restricted to use in forestry products in Ontario, I would be very surprised if you found very many, if any, that are used exclusively in pesticide formulations.

By and large those markets are simply too small to allow a chemical company to formulate an inert ingredient specifically for pesticide end use.

MR. MARTEL: That is the point I'm making though. So, therefore, you could be exposed to them both ways; the inerts in the pesticide, but the inerts in some other form in every day use?

But that potential is there?

DR. RITTER: That potential is there, but you can only be exposed to the pesticide by one way and that's by exposure to the product.

MR. MARTEL: I'm talking about the cumulative effect of both then, the possibility of exposure to the pesticide plus the exposure to it in another form, and by form I don't mean -- I'm talking about in another place.

DR. RITTER: I think the impression that I am trying to impart is that if the pesticide product exposure of a given non-active ingredient of a given inert represents one ten thousandth of one's overall exposure to that product, it would not be practical or expedient to test that component as it's present in a pesticide formulation because the contribution that that makes to one's overall exposure is simply not likely to be of toxicological significance.

So in order to maximize the efficiency of the testing in order to extract as much value as possible from toxicology testing, bearing in mind that

pesticides, in North American at least, are subjected to the most rigorous testing requirements of any industrialized chemicals in use, in our view it's biologically more prudent to test that component to which your exposure will be greatest from that particular application rather than that component to which your exposure will be absolutely minimal, trivial compared to your overall exposure.

There is nothing unique about the inerts or non-active ingredients which are used in pesticide formulations. They are commonly used in everyday life; they are present in shampoos, they are present in car waxes, as many as 600 of them are food grade additives.

MR. CASTRILLI: Q. Dr. Ritter, do we put asbestos fiber in food grade additives?

DR. RITTER: A. I don't know.

Q. Do we put benzene?

A. No, but benzene is certainly present in a variety of consumer products, as we know.

Q. Put in cadmium compounds?

A. Cadmium is present in a variety of consumer products.

Q. Chlorobenzene, epichlorohydrin. All of these items in list 1 have one of the six characteristics EPA has identified for them.

Are you telling me that it is possible they could be in any one of the nine products, and that's not of toxicological significance or of even interest to this Board?

A. I'm not telling you they could or could not be in the products. I don't know.

THE CHAIRMAN: All right. Dr. Ritter, let's ask this question: If you took the seven, eight or nine pesticides that are commonly used for forestry use and went through those applications for registration, would the list of the inerts from those licensed products for use in Ontario in the forestry application be a lengthy list?

DR. RITTER: No.

THE CHAIRMAN: And, Mr. Castrilli, if we had that list of inerts you wouldn't have the formulation, you wouldn't have necessarily the amount of the inert ingredient in conjunction with the active ingredient, because presumably that may be proprietary information the way it's formulated, but if you had the list, where would that take you?

MR. CASTRILLI: Mr. Chairman, once we had the list at least we would know what the inerts are.

It seems to me it's been important for the U.S. EPA to prepare such a list in the United

States; Canada, Dr. Ritter tells me, has not done so.

This Board is in the position of a decision-maker and I question the question you have to ask yourself, Mr. Chairman, is: Is such information unreasonable for you to have in the circumstances, assuming you believe it's important to have at all. I suggest to you...

THE CHAIRMAN: But where are you going to take that information? Suppose you get a list and suppose it has 40 chemicals on it, and suppose two or three of those chemicals are in category one of this exhibit, where does that take you?

MR. CASTRILLI: Mr. Chairman, you would already have made a giant step forward beyond any jurisdiction in the country because this information simply isn't available.

THE CHAIRMAN: Do you or your counsel - and I'm speaking to the federal counsel here, I'm sorry, I have forgotten your name - see any problem with producing a list of the inerts only with respect to the products which are licensed for use in forestry in Ontario?

MS. CRONK: Excuse me, Mr. Chairman. Before that question is answered, might other counsel at least comment on it for your consideration?

THE CHAIRMAN: Yes.

MS. CRONK: There is just one point that I'm advised should be brought to the attention of the Board and; that is, as the U.S. example is being relied upon in terms of Mr. Castrilli's submissions to you, there are circumstances even in the United States, I'm informed, where to obtain a list simply of the identity of the inert ingredients without any indication of amount, quantity or the mixing or anything of that kind, requires a sign off of confidentiality agreement and there is, therefore, an implicit, if not explicit, proprietary element.

I can tell you, sir, only the advice that I received.

THE CHAIRMAN: Well, that is why I am putting this question essentially to counsel for --

MR. CRONK: I suppose what I'm saying, sir, is that without in any way disturbing the answer that is being invited, and even if the answer were to be affirmative, it might be that you should receive submissions from other counsel--

THE CHAIRMAN: Yes.

MS. CRONK: --on it. The federal government perspective on it and that of the owner sometimes are different.

MS. MURPHY: And I haven't had a opportunity obviously to speak to Ms. Prupas today because she has been in the air but again, as I pointed out earlier, I think it's pretty clear that this kind of request, whether this Board has jurisdiction to acede to the request or not, should in fact be made on notice to the people who have the proprietary onus.

THE CHAIRMAN: No, I think, Ms. Murphy, that's correct. Whether or not the Board has jurisdiction, I don't think the Board would exercise it without inviting argument from all interested counsel, No. 1.

No. 2, were it to find that it had jurisdiction to do so, this may be an area where that would have to be given in-camera with undertakings.

But I think the Board is more interested at this stage of the game to see where it would take us. What probative value would it have to this Board of simply knowing that a particular product has a particular variety of inert components.

And perhaps, Dr. Ritter, you could, from your perspective, advise us where it would take us knowing that information?

DR. RITTER: Quite frankly, Mr. Chairman, I think it would take you nowhere at all. Unless you

had the precise proportions of this chemical, as I tried to explain during the course of my presentation and as I think was extracted following that in cross-examination, toxicology per se is not the essence of the concern here, it is really a function of exposure and unless you have precise information on the concentration of those individual components in the individual products so that one might then speculate or perhaps model what the anticipated exposure might be, I think that would put you nowhere at all.

If I told you that a chemical which is at the top of this priority list is present in one of the nine formulations but failed to tell you at what concentration and in which way that product is used, at the very best, I would have misled you.

THE CHAIRMAN: Excuse me one second.

---Discussion off the record

THE CHAIRMAN: Mr. Castrilli, we are having some difficulty and we are certainly not going to make any kind of ruling without some very careful consideration and argument.

We do not intend, as part of this hearing, to get into a discussion of each and every product licensed for use in Ontario in the forestry application in terms of, at this hearing, making a

determination of whether that particular product in accordance with it's particular formulation is or is not acceptable.

That was part of the difficulty the Board had when we dealt with this whole area on the formal motion that you brought earlier on.

As you know, there have been some hearings involving various products which in themselves can last a year, just involving a discussion and investigation of one product alone. Here we are dealing with nine of them, as I understand it, and you are sort of bordering on this danger area that we perceive and I'm not sure whether this is the appropriate forum for that. We are here, overall, looking at forest management practises in the province and we do not want to turn this forest management hearing into a pesticides hearing on nine different products.

We certainly want to hear how the federal government goes about regulating and registering pesticides, as well as how the provincial government does the same. And, within limits, we want to hear about what testing procedures are used and how far and how broad the investigations are by the other regulatory agencies.

MR. CASTRILLI: Mr. Chairman, as you might imagine, this part of my cross-examination builds upon itself and this issue comes back again and again.

I don't particularly want to invite a ruling from you at this point. I might just want to put one or two more questions to Dr. Ritter --

THE CHAIRMAN: Okay.

MR. CASTRILLI: --and perhaps we can have this discussion again before the end of the week.

THE CHAIRMAN: But you understand, I'm sure, the difficulties that we are faced with in the context of this overall hearing.

MR. CASTRILLI: I understand the difficulties.

MR. MARTEL: May I ask Dr. Ritter a question. In conducting a health task force tour, I was advised by chemical workers that three months after a product came out they in fact can tell you what it was made up of, they can tell you the amounts, the whole business.

Is that true, to your knowledge, and I'm not a scientist so I ask you?

DR. RITTER: I don't think it's quite true, I think it's true in a very general sense. I think they can establish, within limits, the kinds of

solvents that may be used in a particular formulation.

I would be surprised if, without going to unbelievable costs, one can actually establish the exact identity of the individual components and their precise concentration in every formulation.

MR. MARTEL: Is it more the concentrations for the formula or the ingredients?

DR. RITTER: It's both.

MR. MARTEL: Both.

DR. RITTER: The concentrations are most certainly critical.

MR. KINGSBURY: If I might just make a comment, though. Certainly in the area of environmental, for the products we are considering, any of these products that have a major component that contributes significantly to the environmental toxicology to some group of organisms, I don't think you will have any trouble finding that because very often it's very much part of the published literature.

So that, although it may not be linked to a specific product and I would remind you, when we use the term product, for example, there are 14 or more products bacillus thuringensis on the market. Okay. Those are different products and each of those is likely to have a different number and percentage and

type of inerts within it.

But for the products where there is a significant contribution from generally a major solvent material, because that is usually when you have enough of the material in it that it has a bearing on it's toxilogical effects, that is known and often the percentage is known and the toxicology of the percentage is part of the base literature that's available in scrutinizing these materials.

In fact, by looking at the registration package it very quickly becomes apparent if there is an ingredient that contributes in large extent to the environmental toxicology and, generally, additional data on that will be found in the registration petition itself.

MRS. KOVEN: Dr. Ritter, does your laboratory undertake any verification analysis on a broad level of classes of compounds to ascertain whether what the manufacturer is telling you is essentially the inert product base is there or not?

DR. RITTER: We do not, but that's done for every product by the Department of Agriculture, that's a part of the registration requirement. They have a laboratory services division which verifies what we tend to refer to as a product guarantee; that is, a

product must contain the active ingredient as specified and to the concentration specified in the final product.

MRS. KOVEN: And in terms of the inert ingredients, is there --

DR. RITTER: Same sort of confirmation process.

THE CHAIRMAN: Okay, Mr. Castrilli, why don't you go on at this time.

MR. CASTRILLI: Thank you.

Q. Mr. Kingsbury, since you were talking about inert ingredients, I have a number of questions for you.

MR. KINGSBURY: A. Okay.

Q. You were talking about, and perhaps for purposes of this discussion you could dig out Exhibit 604C?

A. Is that the ESSA Document?

Q. Yes, it is.

A. Yes, I have it.

Q. Pages 20 and 22 you were discussing the environmental fate of glyphosate.

A. Yes.

Q. And I recall in your evidence as well last week, and also I guess for purposes of the record

page 52 of that exhibit, that you indicate that the -- although glyphosate is relatively non-toxic to invertebrates, the surfactant with which it is used significantly influences the toxic properties of that herbicide. Isn't that right?

A. That's correct.

Q. Surfactant is an inert ingredient; is that right?

A. If you want to give it that label. In the context that it's used in pesticide products where it is not the material having the pesticidal activity...

Q. So the answer to my question is yes?

A. The answer is, in the context, yes.

Q. Thank you. And I believe you have already confirmed that the surfactant added to Roundup formulation of glyphosate has in fact been found to be much more toxic than glyphosate to aquatic species; is that right?

A. It has been found to be more toxic than glyphosate to some of the aquatic species tested, yes, and I believe my direct evidence referred specifically to fish.

Q. Are you familiar with the scientific article written by L. C. Folmar on the toxicity of the

herbicide glyphosate and several of its formulations to fish and aquatic invertebrates?

A. He has written several. I would suspect I am, yes.

Q. Well, that's the only one he has written with that title. Are you familiar with that one?

A. Okay. If that's the specific title, yes, I am.

MR. CASTRILLI: Mr. Chairman, I would like to make this document the next exhibit.

THE CHAIRMAN: Exhibit 726.

MR. CASTRILLI: Mr. Kingsbury, you have a copy of that; is that right?

MR. KINGSBURY: A. Yes, I do.

MR. CASTRILLI: (handed)

THE CHAIRMAN: Thank you.

---EXHIBIT NO. 726: Article entitled: Toxicity of the herbicide glyphosate and several of its formulations to fish and aquatic invertebrates by L. C. Folmar.

MR. CASTRILLI: Q. Mr. Kingsbury, referring you to page 269 which is the first page in the abstract itself, Folmar states that technical glyphosate was considerably less toxic than the Roundup formulation of the -- excuse me -- than the Roundup

formulation or the Roundup surfactant to several species.

And the article goes on to identify what the species are. Do you generally with that statement?

MR. KINGSBURY: A. That's correct.

Q. And, Mr. Chairman, and Mr. Kingsbury, he identifies what the technical glyphosate is for the purpose of this study and the formulated herbicide Roundup and the Roundup surfactant; is that right? That's in the first page -- the first paragraph. Can you confirm that for me?

A. Could you just -- you are still referring to the very first page?

Q. Yes, that's right.

A. Okay. Where he talks about technical grade glyphosate and gives it a lab number, basically.

Q. Yes, that's right.

A. That's right.

Q. In the middle of the page, still on page 269, Folmar notes that the toxicity of the surfactant which he identifies in this article as MON0818 were similar to those of the Roundup formulation; is that right? It's the middle of the page.

A. I believe -- I agree with your

statement. I can't find it right now at the moment.

Q. It is there, trust me.

A. Okay.

Q. Can I just ask you to turn page 272, Table 1.

A. Yes, I have it.

Q. And we are also going to be looking at Table 2 which is on page 273.

A. Yes.

Q. Looking first of all at the identification of what some of the symbols mean, the LC50, looking at Table 1, toxicity of Roundup to aquatic invertebrates and fish and identifies the LC50.

Now, can you confirm for me that the LC50 is the concentration lethal to 50 per cent of the test organisms?

A. Under the conditions of the test, yes, that's correct.

Q. Okay. Now, just looking at Table 1 and this is at the column 96 hours, the rainbow trout.

A. Yes.

Q. See the LC50 was 8.3 and that's milligrams per litre; is that correct?

A. That's correct.

Q. And that would also be 8.3 parts per

million?

A. Yes.

Q. And the toxicity at 96 hours for fathead minnows which is directly below rainbow trout is 2.3 milligrams per litre?

A. That's correct.

Q. And then looking at the next table which is Table 2, the heading of that table: Toxicity of technical glyphosate and the Roundup surfactant to midge larvae and four species of fish.

Can you confirm for me, and again we are looking at the LC50s in this case, can you confirm for me that the LC50 of the Roundup surfactant at 96 hours was 1 milligram per litre for fathead minnows, that's under surfactant?

A. Yes, that's correct.

Q. And for rainbow trout it was 2 milligrams per litre?

A. That's correct.

Q. And just looking at the top part of Table 2, the LC50 for glyphosate itself at 96 hours was 97 milligrams per litre.

A. For fathead minnows.

Q. For fathead minnows; is that right?

A. Yes. 140 for rainbow trout.

Q. And 140 for rainbow trout?

A. Correct.

Q. So that just comparing the surfactant's toxicity, that is to say, the LC50 at 96 hours to that of glyphosate for rainbow trout, would you agree that the surfactant is roughly 70 times more toxic to rainbow trout than glyphosate itself?

A. That's correct.

Q. Would you agree, Mr. Kingsbury, that these results suggest that the surfactant doesn't merely increase the biological activity of glyphosate but was itself the primary toxic agent in Roundup?

A. That's correct. The primary agent causing the effect and the reason I phrase it that way is simply because there is a possibility with this surfactant which is sort of a detergent-type material that the effect it exerts may not be an effect that's so much because of the toxicology in the context of a pesticide poisoning acting on a nervous system as it may in fact largely act through a physical interaction with the organism.

Q. That's fine. Can I ask you to turn to page 272 of the same exhibit.

A. I'm there.

Q. And we are looking at the second to

last sentence under the heading: Acute Toxicity.

A. "These results..."?

Q. Yes. The sentence reads:

"These results suggest that the surfactant did not merely increase the biological activity of glyphosate but was itself the primary toxic agent in Roundup."

Do you agree with that sentence?

A. Yes, that's what we just said.

Q. Thank you. Mr. Kingsbury, can you confirm for me that aquatic toxicity tests in Canada as well as the United States -- the Folmar exercise was done in the United States; is that right?

A. That's correct, I believe it was done at --

Q. State of Washington -- Missouri, excuse me.

A. Or the Columbia Fish Lab, I believe that's where.

Q. That's right. Would you agree that aquatic toxicity tests in Canada as well as the United States have verified that the surfactant in Roundup is the major toxic component of Roundup?

A. Yes, and there is quite a body of

literature on toxicity of Roundup and they would all tend to indicate that.

MR. CASTRILLI: Mr. Chairman, I just have one example of that body of literature. Mr. Kingsbury, I am sure has a copy of it.

Q. Mr. Kingsbury, I am referring to an article by J. A. Servizi and others?

MR. KINGSBURY: A. Yes, I have it.

Q. It is entitled: Acute Toxicity of Garlon 4 and Roundup Herbicides to Salmon, Daphnia and Trout.

A. Mm-hmm.

MR. CASTRILLI: Mr. Chairman, I would like to make this the next exhibit.

THE CHAIRMAN: 727.

MR. CASTRILLI: Mr. Kingsbury, you have a copy of that; right?

A. Yes, I do.

MR. CASTRILLI: (handed)

THE CHAIRMAN: Thank you.

---EXHIBIT NO. 727: Article entitled: Acute Toxicity of Garlon 4 and Roundup Herbicides to Salmon, Daphnia and Trout by Servizi, et al, 1987.

MR. CASTRILLI: Q. Mr. Kingsbury, we were talking about what is now Exhibit 727 which is research

done by the Department of Fisheries and Oceans by the Fisheries Research Branch of British Columbia in 1987.

And I ask you if you would agree with the proposition that aquatic toxicity tests in Canada have verified that the surfactant in Roundup is the major toxic component of Roundup and that the surfactant is much more toxic than glyphosate, and you agree with that proposition; is that right?

MR. KINGSBURY: A. To fish, yes.

Q. To fish, yes. I refer you to page 20 of this exhibit.

A. I have it.

Q. Just looking at the last paragraph in -- sorry, the last sentence in the last full paragraph on the page, the authors conclude:

"It is evident from the foregoing..." and what he is referring to is at least the previous paragraph:

"...that MON0818..." the same surfactant we saw in the Folmar research:

"...is much more toxic than glyphosate." Do you agree with that proposition?

A. To fish, yes.

Q. To fish, yes. And continuing with page 20, and now looking at Table 4?

A. Yes.

Q. The heading of which is Acute Lethality of Roundup?

A. Mm-hmm.

Q. And also we have to look at Table 5 on the next page, 21, which is Acute Lethality of Surfactant--

A. Yes.

Q. --MON0818. First of all, just looking at --

A. Would you like me to verify that this basically draws the same conclusion that the surfactant is more toxic than --

Q. I want to take you through the numbers?

A. Okay.

Q. Looking at sockeye salmon fry, lethal concentration 50, you would have to look at Table 4 and Table 5 at the same time, confirm for me that the 96-hour LC50 for Roundup was 28.8 milligrams per litre?

A. Yes.

Q. That's in Table 4, and the 6 hour LC50 for the surfactant in Table 5 was 2.60 milligrams per litre?

A. Yes.

Q. Do you agree that this suggests that in sockeye salmon fry the Roundup surfactant; i.e., the 2.60 milligrams per litre figure is roughly ten times more toxic than Roundup?

A. To sockeye fry, yes.

Q. Yes. And that figure is 28.8 milligrams per litre?

A. I agree.

Q. And your answer is yes, that it is roughly ten times more toxic than Roundup?

A. To sockeye fry, yes.

Q. An looking at rainbow fry, again for Tables 4 and 5, do you agree that the Roundup surfactant is roughly eight times more toxic than Roundup?

A. Yes, I would.

Q. And those numbers are 3.20 milligrams per litre in Table 5 versus 25.5 milligrams per litre in Table 4?

A. Yes.

Q. Now, Mr. Kingsbury, at page 21 of the ESSA report you refer to glyphosate -- sorry, do you have that before you?

A. Yes, I do.

Q. At that page you refer to glyphosate

and residues in water declining rapidly. Can you advise the Board whether the mobility of the Roundup surfactant in surface water and run-off has been studied?

A. The surfactant -- the type of residue analysis carried out would not distinguish the presence of the surfactant. It's implicit from the role of the surfactant, to my understanding, that the two would remain associated. It has not been studied directly.

Q. So the answer to my question is, it has not been studied?

A. But although it has not been quantified, its impacts have been evaluated because we have looked at the product under field testing conditions with direct overspray and introduction into aquatic system.

Q. All right. Let me repeat the question, so that I'm clear on your answer. Has the mobility of the Roundup surfactant in surface water and run-off been studied?

A. No, it has not specifically been studied.

Q. Thank you. Now, we have been talking about fish for the last 15 minutes.

Dr. Ritter, I'm wondering if you can

confirm for me that the Roundup surfactant which we have been calling MON0818 is substantially more toxic than the active ingredient in humans?

DR. RITTER: A. No, I cannot confirm that.

Q. Dr. Ritter, were you provided with an article -- I guess it's a letter, in the February 6, 1988 edition of Lancet. Are you familiar with that?

A. Yes, I am.

MR. CASTRILLI: Mr. Chairman, I would like to make this the next exhibit.

THE CHAIRMAN: Exhibit 728.

MS. CRONK: I'm sorry, sir. I understand Mr. Castrilli to say that this is a letter. Other counsel haven't been provided with a copy of it and I wonder, before it's formally marked, if we might see it.

THE CHAIRMAN: Okay.

MR. CASTRILLI: It's printed in the Lancet.

THE CHAIRMAN: Well, do you want to give it to the other counsel, Mr. Castrilli, just before we formally admit it.

DR. RITTER: Mr. Castrilli, I have misplaced it. If you have an extra copy...

MR. CASTRILLI: Mr. Chairman, without this in front of you, you can't gather as to what it is, but what it is is a letter by four Japanese doctors from the Department of Emergency Medicine at Kagoshima University in Japan writing on the topic of probable toxicity of surface-active agent in commercial herbicide containing glyphosate.

The Lancet, as you know, is a respected medical journal and as part of the obligations it fulfills to the international medical community, it publishes not only articles, but it also publishes letters.

This particular letter summarizes the clinical investigations of those four doctors with respect to acute toxicity involving the surfactant that we have been talking about in glyphosate.

It seems to me it's entirely admissible in the circumstances.

MS. CRONK: I didn't submit that it wasn't, sir, I just wanted to see it. If it turns out I'm familiar with the article and, as long as it's clear that it's a letter to the editor of the publication, with that status...

THE CHAIRMAN: I know that the Lancet is a refereed journal. Are the letters to the editor also

refereed; do you know, Mr. Castrilli.

MR. CASTRILLI: I'm sorry, I cannot confirm that for you one way or the other.

THE CHAIRMAN: Okay. Very well, we will admit it as Exhibit 728.

---EXHIBIT NO. 728: Copy of letter entitled: Probable toxicity of surface-active agent in commercial herbicide containing glyphosate; published in The Lancet, February 6, 1988.

MR. CASTRILLI: Q. Now, Dr. Ritter, I prefaced my question five minutes ago with the proposition that: Could you confirm for me that the Roundup surfactant which is identified in what is now Exhibit 728 as - I will not try and pronounce this word, Mr. Chairman, I will simply use the acronym - POEA is substantially more toxic than the active ingredient in humans, as well as aquatic species. I realize you can't speak to the aquatic species part, but you, I believe, can speak to the humans part.

DR. RITTER: A. Yes. No, I don't think this paper indicates that it's substantially more toxic, I think what the paper indicates is that it's substantially more corrosive.

This is a detergent and the primary manifestation upon autopsy was erosion of the oesophagus and various components of the stomach and

intestinal tract. That is an observation on post-mortem which would be entirely consistent with a highly corrosive-type agent.

To try to answer your question more directly, it's sort of like asking me is lye more toxic than aspirin. It's not a matter of toxicity, it's a matter of its corrosive properties.

Lie never has an opportunity to become toxic because it eats through your oesophagus on contact and this is essentially the property of this agent. I would remind you that this was following direct oral ingestion of a product for which contact is to be avoided.

I would add, anecdotally perhaps, that there are less difficult ways to kill oneself.

Q. That's fine. So do you not agree with the Japanese doctors that the surfactant is in fact toxic, your submission is -- your testimony is that it's corrosive not toxic; is that right?

A. No. My testimony is what when -- you can't compare the corrosive aspect of this detergent to the toxic property of glyphosate.

The Japanese physicians are using the term toxicity in its generic context and obviously I would not disagree that an agent which can eat through

the oesophagus is toxic, but you have made a comparison between the toxicity of glyphosate and the toxicity of this agent.

Really all that I'm trying to do is to clarify that these are not the same sort of thing; one is acting strictly through erosion of the oesophagus, the other component, whatever toxicity it may have, is acting by an entirely different mechanism. So it's difficult to compare them directly and to ask: Is one more toxic than the other because they are operating by two entirely different mechanisms.

The polyoxyethyleneamine really never has an opportunity to become toxic, it will cause death rapidly as these physicians have attested to in the cases which were presented to them and almost always with virtually identical presentations entirely consistent with a very corrosive agent.

I don't know if I have clarified that or confused it, but I guess the point that I'm trying to make is that it's difficult to compare the action of these two agents directly and say one is worse than the other, or one is better than the other; they are different. That is really the point I'm trying to make.

Q. And do you know whether glyphosate

causes erosion of any part of any body?

A. Yes, I do, and it does not.

Q. Okay, thank you. Just as a point of information, Dr. Ritter, if you know, do you know whether POEA is capable of being stored in fats?

A. I don't know, but judging from -- I don't know exactly, precisely, but judging from the structure I would be surprised if - how does one put this - if exposure to it were possible in oral concentrations without inducing death, I would be surprised if it were not metabolized to some significant extent.

Q. Some the answer to my question is, assuming what you have just said to be the case, that yes, it could be stored in fats?

A. No, I said the contrary. I said assuming that exposure could take place without inducing death, I don't think it would be stored at all, I think it would be rapidly turned over.

Q. Okay. Assuming for the moment - and I put this to you as a hypothetical - if it was capable of being stored in fats, would it have the potential to bio-accumulate?

A. I can't answer that question because I have already said I don't think it would store in

fat.

Q. Sorry, let me put the question to you this way: If it's lipophilic, which is the same thing as being capable of being stored in fats, is something that is lipophilic capable of bio-accumulating?

MS. MURPHY: Is the question now: Is something that is lipophilic capable of bio-accumulating?

MR. CASTRILLI: Yes.

DR. RITTER: And the answer is yes.

MR. CASTRILLI: Q. Thank you. Dr. Ritter, can you advise the Board as to the current acceptable daily intake in Canada for glyphosate?

DR. RITTER: A. No, I can't.

THE CHAIRMAN: Is that intake through contact dermally, or are you talking orally?

MR. CASTRILLI: Intake through eating.

THE CHAIRMAN: Orally?

MR. CASTRILLI: Yes.

Q. Sorry, your answer was you don't know?

DR. RITTER: No, I don't know.

Q. Do you know whether, whatever the acceptable daily intake for glyphosate is, whether it takes into account the surfactant?

A. No, I'm not aware of that either, I'm sorry.

Q. That's fine. Mr. Kingsbury, beginning at page 52 of the ESSA report --

MR. KINGSBURY: A. I have it.

Q. You review the general toxicity of glyphosate to wildlife.

A. The authors of the report do that, yes.

Q. You are here in their stead, I understand. Can you confirm for me that the authors of the ESSA report do not review the potential uptake and accumulation of the Roundup surfactant in rodents, birds, wildlife, et cetera?

A. From my understanding of it, there basically -- there isn't a separate body of literature available on that topic, there basically is not literature on that to be reviewed.

Q. In your experience do you know whether it has been investigated, whether or not there has been reported literature?

A. In the process of generating the registration data for registration, one of the studies that would have been done would be a metabolism study.

In the course of that study the product

which would, of course, include the surfactant, would be administered to organisms and I can't tell you specifically the protocol for the registration study we might be looking at in this specific instance of glyphosate, and the fate of the product would be studied often using labeled product radio-labelled product.

This would allow one to quantify where it moved and the rate at which it was eliminated from the organism and, in the course of doing a study such as that, I suspect - but without having the study in front of me - one would be able to draw considerable conclusions about the fate of the surfactant within organisms.

Q. You suspect but you do not know; is that right?

A. That's correct.

Q. Thank you. Right.

A. It would partly depend on the labelling applied, where the label was on the molecule.

Q. But in any event you do not know; is that not right?

A. Without having that study in front of me, no, I couldn't comment on it.

MR. CASTRILLI: Mr. Chairman, can I have

a sense of how long the Board intends to sit this evening? I know Dr. Ritter has been on quite a journey.

THE CHAIRMAN: Well, can we have a sense of how long you would like to continue? We are quite prepared to take a break and...

MR. CASTRILLI: I think Dr. Ritter might want to take a longer than 10-minute break, but I'm in your hands. I could go on quite awhile; I can also stop in 15 minutes.

MS. MURPHY: Maybe you should ask, Dr. Ritter.

THE CHAIRMAN: Dr. Ritter, how do you feel about taking a break and then continuing on for awhile?

DR. RITTER: I would like that very much; that is, I would prefer to continue this evening with a break rather than to break off at this time.

THE CHAIRMAN: Okay. I think -- why don't we have a break for, say, 15 minutes and then come back and at least go for another hour, hour and a half?

MR. CASTRILLI: I'm content if the witnesses will be awake by then.

THE CHAIRMAN: Well, I think we will

check with the witness from time to time, but if he is awake and appears to be moving, and you are prepared to proceed, Mr. Castrilli, I think we would like to accomplish as much as we can tonight.

MR. CASTRILLI: That's fine. That's fine for me, Mr. Chairman.

MR. KINGSBURY: I took the Chairman's advice and had a nap this afternoon.

MR. CASTRILLI: So did I.

THE CHAIRMAN: All right. Should we take a break at this time, Mr. Castrilli?

MR. CASTRILLI: That's fine.

THE CHAIRMAN: Very well, 15 minutes.

---Recess taken at 8:45 p.m.

---On resuming at 9:10 p.m.

THE CHAIRMAN: Thank you. Be seated, please.

MR. CASTRILLI: Q. Dr. Ritter, we were talking about inert ingredients. We have been talking about inert ingredients in relation to glyphosate, and now I would like to talk about some contaminants.

MR. FREIDIN: Can you turn your microphone on, Mr. Castrilli, please. Thank you.

MR. CASTRILLI: Q. Can you confirm for me, Dr. Ritter, that as much as 28 per cent of

glyphosate becomes the acid AMPA in plants?

DR. RITTER: A. No, I can't.

Q. Are you familiar with a U.S. EPA registration guidance document on glyphosate?

A. Yes, I am.

THE CHAIRMAN: What was that question again, becomes what kind of acid?

MR. CASTRILLI: I just used the acronym again because I wouldn't dare try and pronounce it. The acronym is AMPA.

THE CHAIRMAN: Oh, sorry. AMPA.

MR. CASTRILLI: Mr. Chairman, Dr. Ritter and I have just been speaking of a registration document produced by the United States Environmental Protection Agency entitled: Guidance for the Reregistration of Pesticide Products Containing Glyphosate as the Active Ingredient. It's a June, 1986 publication.

Q. Dr. Ritter, that's the one you are familiar with; is that correct?

DR. RITTER: A. Yes, it is.

MR. CASTRILLI: Mr. Chairman, I would ask that this be made the next exhibit.

THE CHAIRMAN: Very well. Exhibit 729.

MR. CASTRILLI: Q. And, Dr. Ritter, you

have a copy; is that right?

DR. RITTER: A. I have certainly seen a copy. I am just trying to locate mine. Again, if you happen to have an spare one handy it will expedite things a little bit. I have it, yes.

MR. CASTRILLI: Mr. Chairman, I should note it is a rather bulky document. These are excerpts from that, it is not the full document. (handed)

THE CHAIRMAN: Thank you.

---EXHIBIT NO. 729: Excerpts from U.S. EPA document entitled: Guidance for the Reregistration of Pesticide Products Containing Glyphosate as the Active Ingredient, June, 1986 publication.

THE CHAIRMAN: Why does it refer to reregistration, Mr. Castrilli? Is this the first -- does this only refer to pesticides which have been previously registered?

MR. CASTRILLI: Yes, that's right. Glyphosate has been registered in the United States prior to 1986.

Q. Dr. Ritter, in what is now Exhibit 729, I would like to refer you first to page 12.

DR. RITTER: A. Yes.

Q. This is generally under the heading of toxicology characteristics--

A. Yes.

Q. --of glyphosate. And I am looking at the heading: Plant Metabolite and there is then an unpronouncable acid which the acronym for which is AMPA; is that right?

A. Yes.

Q. And the first paragraph under that heading reads, in part:

"The agency has determined that the metabolite..."

And I will just call it AMPA:

"...is formed on plants in amounts that can range as high as 28 per cent of the total residue on the plant."

The document goes on to state:

"Since the extent of glyphosate metabolism was not adequately addressed in the rat metabolism study under glyphosate, the possibility exists that the AMPA metabolite could pose a hazard to humans that was not evaluated by testing the parent compound glyphosate."

Do you see that paragraph -- that part of the paragraph?

A. Yes, I do.

Q. Do you agree with that assessment, Dr. Ritter?

A. Yes. The question -- the point that you are making here relates really to a concept of food intake. This issue of metabolism of the parent compound to the aminomethylphosphonic acid really has, in my view at least, very little to do with the question of occupational exposure in the forestry setting; that is, this compound would have to be ingested before the possibility of metabolism becomes an issue at all.

And given that the intended use of this product in the particular scenario in which this hearing is concerned with does not provide the opportunity for direct ingestion, in attempting to assist you I would just suggest that this information on the metabolism really is not of any direct relevance.

Q. Well, I thought you said you began by agreeing with the second sentence. Do you disagree with that sentence?

A. No.

Q. Because the U.S. EPA says that it could pose a hazard to humans that was not evaluated by testing the parent compound -- testing the parent

compound glyphosate.

A. That's correct.

Q. Now, you agree with that sentence?

A. What I'm trying to explain is that this reregistration document refers to all uses of glyphosate.

As I am sure you are aware, the primary uses of glyphosate are in agriculture not in forestry. So this component of the paragraph attempts to deal with all possible hazards from exposure to glyphosate.

Because the vast majority of exposure from glyphosate will be through the food route, this becomes a significant -- a potentially significant issue if one is attempting to assess toxicity from that route.

The point I'm trying to make is that, in my view at least, the opportunity for oral ingestion is not the route with which this hearing is concerned.

Q. Do edible berries grow in the forest, Dr. Ritter?

A. Yes, they do.

Q. Thank you. Turning to page 13 of Exhibit 729, and we are looking at the top of the page, the second sentence.

A. Yes.

Q. "No studies are available by which to assess potential mutagenic, reproductive, oncogenic or chronic effects of AMPA. The need for additional testing of this compound will be assessed after the submission of an acceptable rat metabolism study with glyphosate."

Do you see those two sentences?

A. Yes.

THE CHAIRMAN: What page?

MR. CASTRILLI: Page 13.

THE CHAIRMAN: 13.

MR. CASTRILLI: I'm sorry. Mr. Chairman, we are at the top of the page 13 beginning the second sentence that reads: "No studies..."

THE CHAIRMAN: Thank you.

MR. CASTRILLI: And onto the end of that paragraph.

Q. Dr. Ritter, this document is of course in relation to the situation in the United States. Can you confirm for me that Canada does not have such studies either?

DR. RITTER: A. No, I cannot confirm that for you.

Q. You don't know?

A. No, I don't. This document was issued, as you indicated, in 1986. The sentence before the one that you read indicated that:

"The available data do not suggest that the compound poses any hazard distinct from that of the parent compound."

The paragraphs before this one which you read in fact indicate that if the rat metabolism data were to suggest that metabolism to this metabolite from the parent compound is similar to what it is in plants, then all of the available data would suffice to address the potential toxicity of that metabolite.

I can't tell you off the top of my head at this time if that additional metabolism has been submitted and, if so, what the outcome of it was.

But it is interesting to note perhaps that in 1989 the product not only continues to be registered in the United States but indeed the registration has been expanded substantially during that three-year period which, in the absence of definitive information on your question, would lead me to believe at this time, three years later, the EPA is satisfied that this is not an issue.

Q. Does Canada do its own independent assessments?

A. Yes, we do.

Q. Turn to page 82.

A. 82, did you say?

Q. Yes, the same document.

A. Yes.

Q. We are looking here at Table 1, Generic Data Requirements for Glyphosate and under the heading Special Testing, general metabolism, in June of '86 U.S. EPA did not have such data and said in the column near the end: Must additional data be submitted? The answer was yes and the time frame for submission was 24 months.

So roughly 24 months from June of '86, roughly June of '88 such data would have to be submitted. How long would it take to evaluate such data?

A. Metabolism data are among the simplest which we receive. I would say it would depend on backlog, but I would imagine months is the order that we are probably talking about.

Q. Has Canada received such a rat metabolism study?

A. Again, I'm not aware.

Q. Is that something you could undertake to find out?

A. Yes.

Q. Thank you. And in doing that, would you also advise the Board by way of summary whether Health and Welfare Canada concluded the rat metabolism study was acceptable or not, or any further action that may have arisen as a result of that review?

A. In attempting to answer your question, Mr. Castrilli, as full as possible, I will endeavour to - I will do more than endeavour - I will find the answer to your question as to whether or not this data would have been submitted.

But I would hasten to add again, as I indicated a moment ago, that this data would have been generated and submitted in compliance with a food residue question and, should that be the case, it may be necessary for you to redirect your question to someone concerned with food safety from within the Health Protection Branch.

If the study has been submitted, I certainly would not be the best person to address the application of those results in terms of establishing maximum residue limits for glyphosate in food, and if the study has not been submitted, again I would not be the best person to explain why that's all right.

Q. Well, perhaps you can just be the

best person to tell us whether the study has been submitted?

A. Yes.

Q. And if there is an official department position on the acceptability of the study and you are easily able to find that out, would you provide that information as well?

A. Yes.

Q. Thank you.

Q. The next question is really directed to both Mr. Kingsbury and Dr. Ritter. Can you confirm for me, gentlemen, that AMPA is converted -- further converted to formaldehyde?

A. I believe it is to some extent, yes.

Q. Dr. Ritter, Mr. Kingsbury, do you have or are you familiar with an article entitled: Photodegradation of the Herbicide Glyphosate in Water? It is by two people from Norway, Lund-Hoie, H-o-i-e, and Friestad, F-r-i-e-s-t-a-d.

A. Was it in the package of information you made available to us on Friday?

Q. Yes.

A. Then I will have seen it.

Q. And perhaps since this article is one that builds on the work of an earlier one done in the

United States, are you familiar with an article by Melvin Rueppel, R-u-e-p-p-e-l, who is a researcher at Monsanto in the United States entitled: Metabolism and Degradation of Glyphosate in Soil and Water? It was given to both of you.

MR. KINGSBURY: A. I have seen it in the package that you gave us.

Q. It's also referred to in the ESSA document, Mr. Kingsbury.

MR. CASTRILLI: Mr. Chairman, I would like to make both of these the next two exhibits. The Norwegian article first, Photodegradation of the Herbicide Glyphosate in Water.

THE CHAIRMAN: Exhibit 730.

---EXHIBIT NO. 730: Photodegradation of the Herbicide Glyphosate in Water by Lund-Hoie and Friestad.

MR. CASTRILLI: And the second one: The Metabolism and Degradation of Glyphosate in Soil and Water by Melvin Rueppel, and that's spelled R-u-e-p-p-e-l.

THE CHAIRMAN: Exhibit 731.

---EXHIBIT NO. 731: Article entitled: Metabolism and Degradation of Glyphosate in Soil and Water by Melvin Rueppel.

MR. CASTRILLI: (handed)

THE CHAIRMAN: Thank you.

MR. CASTRILLI: Q. Gentlemen, looking first at what is now Exhibit 730, the Norwegian article on the photodegradation of the herbicide glyphosate in water, Dr. Lund-Hoie at page 728 -- sorry, do you have the page?

DR. RITTER: A. Yes.

Q. The first full paragraph on the page states:

"It is accepted knowledge that...(AMPA) is the principal metabolite of glyphosate in soil and that this metabolite is further converted to formaldehyde via..."

Another unpronouncable acid, and actually the reference is to the other article we have just made an exhibit, Exhibit 731.

And I would just like to refer you to page 524 before I ask these questions with respect to both of these exhibits, 524 of Exhibit 731.

Do you have it?

A. Yes.

Q. We're at the top of the page. The authors indicate that previous work - and they refer to a study done in 1968 - and then they refer to their own studies with yet another unpronouncable product:

"...have established the biochemical and

chemical bases respectively for converting to..."

And they are referring to AMPA:

"...to formaldehyde via..."

That other unpronouncable acid. Do you see that reference?

A. Yes.

MS. CRONK: Excuse me, Mr. Castrilli, what page is that?

MR. CASTRILLI: 524.

Q. I trust, Dr. Ritter, if you need to say the acids you can in fact pronounce them, I will just call them one and two.

Were you aware of these -- gentlemen, were either of you aware of these studies findings before I brought them to your attention?

MR. KINGSBURY: A. I was not aware of them aside from the reference in the ESSA Document.

Q. To the Rueppel article?

A. Yes.

Q. Dr. Ritter?

DR. RITTER: A. I can't recall being specifically aware of them, no.

Q. And I believe you have indicated, Dr. Ritter, that - or you haven't - they have indicated

that it is converted to formaldehyde and you accepted those findings as arising from these two articles indicate that to be the case.

Can you further confirm for me, Dr. Ritter, that formaldehyde poses a carcinogenic risk to humans?

A. Primarily, in fact some might argue exclusively through the inhalation route.

MS. CRONK: I'm sorry, Mr. Chairman. I wasn't intending to rise before Dr. Ritter gave the answer. The question as posed assumes confirmation of that prior question that I didn't understand the witness had confirmed.

I have no difficulty with the second part of the question, you have the answer, but for the record, I don't agree that's what the witness said.

MR. CASTRILLI: I'm not sure I recall what it is Ms. Cronk is objecting to, if she's making an objection.

THE CHAIRMAN: Well, you were putting the words in the witness' mouth as to its carcinogenic effects.

MR. CASTRILLI: Oh, I'm sorry. I believe I stopped in mid-sentence realizing I hadn't yet asked him that question, and that's why I restated it.

MS. CRONK: I'm sorry, sir, it's late at night, I don't mean to be obstreperous, but the question in the first part suggested that Dr. Ritter had confirmed that these two articles established that by virtue of the degradation process of glyphosate, formaldehyde was produced.

I didn't understand him to confirm that and, secondly, for the record, that is not what I believe both of these articles are saying, that's a matter for legal argument.

If the witness did confirm that, I stand corrected. I don't believe that was the evidence.

THE CHAIRMAN: Well, I think he indicated that he believes that formaldehyde was produced by AMPA, was further broken down into...

I won't go around that argument, but I think you did confirm earlier that it was your belief that formaldehyde resulted from a further breakdown of AMPA; is that not correct?

DR. RITTER: Yes, I did. But AMPA is not the sole metabolite of glyphosate. So that the -- the concentration of glyphosate, and I think that is perhaps where the confusion is arising, if I have imparted the impression in the last answer that formaldehyde is essentially the sole final metabolite

of glyphosate, then I have imparted the wrong impression.

MR. CASTRILLI: Mr. Chairman...

DR. RITTER: It is a subsequent metabolite of yet another metabolite which, in itself, is only one quarter of the total metabolites produced by glyphosate.

MR. CASTRILLI: That's fine. I wasn't suggesting it was the only one. As long as he confirms, and he has confirmed, that it's one of them.

Is that right, Dr. Ritter?

DR. RITTER: Yes.

MR. CASTRILLI: I'm content with that answer.

DR. RITTER: And you asked...

MR. CASTRILLI: Q. I ask you to now confirm whether it's your understanding that formaldehyde poses a carcinogenic risk to humans?

DR. RITTER: A. Through the inhalation route. But I would remind you, Mr. Castrilli, as I'm sure you are aware, in the cancer testing, in the cancer bioassay in both the rat and mouse for glyphosate, glyphosate is tested for at least 90 per cent of the anticipated lifespan of the test animal.

Should that metabolism constitute a

potential risk, that risk would have had ample opportunity to express itself during the course of the cancer bioassay because it is the parent compound that is tested.

Given that that risk has not expressed itself in the cancer bioassay, I think it would be reasonable to conclude that if that metabolite is present in mammals it does not express that potential carcinogenicity.

Q. Dr. Ritter, we will get to that. I want to do this one step at a time. I have also provided to you a report entitled: Report of the Federal Panel on Formaldehyde and actually it's an excerpt from it. Are you familiar with that?

A. Yes, I am.

MR. CASTRILLI: Mr. Chairman, I request that this be made the next exhibit. I have in fact only included the executive summary and conclusions of what is yet another lengthy document.

I would just add that the Report of the Federal Panel on Formaldehyde was in fact done for the U.S. Consumer Product Safety Commission and the U.S. National Toxicology Program. It just doesn't happen to appear on the cover page.

THE CHAIRMAN: Okay. Exhibit 732.

---EXHIBIT NO. 732: Excerpt of report entitled: Report of the Federal Panel on Formaldehyde, November, 1980.

MR. CASTRILLI: Q. Dr. Ritter, do you have those excerpts?

DR. RITTER: A. Again, if you have a copy. I have them, but you can probably provide it more quickly than I can find them.

MR. CASTRILLI: (handed)

DR. RITTER: Thank you.

MR. CASTRILLI: Q. Dr. Ritter, just referring to the bottom of what is now Exhibit 732, the executive summary.

DR. RITTER: A. Yes.

Q. The Panel which the membership of which is on the previous page, a previous page, concluded that:

"It is prudent to regard formaldehyde as posing a carcinogenic risk to humans."

Do you agree with that assessment?

A. By the inhalation route. That is actually contained in the executive summary which you have submitted. I would refer you, Mr. Castrilli, to the third full paragraph, third full sentence in:

"By inhalation, formaldehyde caused cancer of the nose in rats."

Q. That's fine, no dispute. Could I ask you to turn to conclusions, which would be page 64 and the only other page that's part of this.

And we are looking now at the sixth dot down. The panel reconfirms its view that formaldehyde should be presumed to pose a carcinogenic risk to humans and in the fifth dot, the one up, indicates that that:

"Formaldehyde may be carcinogenic to species other than the rat and to tissues other than the nasal."

Do you agree with that assessment?

A. There is no evidence that I'm aware of to support that statement at present.

Well, let me rephrase that. It says 'may be'. I suppose one doesn't need evidence to support a 'may be', but let me say that I'm not aware of evidence that would change that 'may be' to 'is'. It always 'may be', but I'm not aware of any evidence linking formaldehyde by any route other than inhalation to carcinogenicity.

Q. Is it something that one should take into account in the use of these products in a forestry context?

A. Indeed it's taken into account in the

long-term bioassay testing. As I indicated to you a moment ago, these products are tested for periods which are anticipated to cover the majority of the lifespan of the test animal and they are taken into very serious account in that test protoco.

If that metabolite is produced at the exaggerated concentrations in that bioassay and if the metabolite indeed were capable of causing effects other than the nasal effects noted through the inhalation route, one might have expected that those effects would have expressed themselves. To the best of my knowledge, they have not.

So I would say, yes, that possibility is taken into account and it has been addressed and, in my view, does not constitute a viable risk.

Q. Have you had an opportunity to review the U.S. EPA registration document that I provided to you?

A. On glyphosate?

Q. Yes.

A. Yes.

Q. Do you see any reference in there to formaldehyde, or did you see any reference in that document to formaldehyde?

A. I don't recall if I did or didn't,

quite frankly.

MS. MURPHY: Is that a document that has not been filed?

MR. CASTRILLI: No, that is what is now Exhibit 729.

MS. MURPHY: Are you aware of a place that it is?

MR. CASTRILLI: There's no place, but it's him who gives the evidence not me.

DR. RITTER: That is 729 you are referring to?

MR. CASTRILLI: Yes.

DR. RITTER: Yes, I have it.

MR. CASTRILLI: Q. There's no place for me to refer you to, Dr. Ritter.

DR. RITTER: A. I have the document.

Q. Unfortunately, I cannot refer you to a place because there isn't one.

A. You are referring to the formaldehyde contents.

Q. Yes.

A. I don't know if I have made myself clear, Mr. Castrilli. If you take a look at the doses tested in this compound, I would refer you perhaps, if I may, to page 6 of that document.

At the top of the page you will note that it says:

"A chronic feeding oncogenicity study in mice were tested at doses of 1,000, 5,000, 30,000 parts per million."

30,000 parts per million, that actually represents a rather significant proportion of the diet.

The point really that I was trying to make is that if the conversion of glyphosate to anything, formaldehyde or any other metabolite for that matter, could express ultimately as a carcinogenic response, one might have anticipated that these studies would have provided the opportunity for that expression. That event has not taken place.

Remember that we are feeding the parent compound so that every opportunity for metabolism is present during the course of these studies.

Q. My question to you is simply: Did U.S. EPA identify formaldehyde in this report and, to your knowledge, the answer is...?

A. No.

Q. Thank you. Can you also confirm for me, Dr. Ritter, while we are on the subject of glyphosate, that glyphosate -- excuse me, that formaldehyde has been identified as a neurotoxin in

humans at low exposure levels?

A. At low exposure levels for many years, yes.

Q. You agree?

A. I'm familiar with the literature. I don't know how to answer that question, if I would agree that it's a neurotoxin. There is literature to support that suggestion, yes.

Q. Are you familiar with an article by Doctors Kilburn and Warshaw entitled: Formaldehyde Impairs Memory, Equilibrium and Dexterity in Histology Technicians: Effects Which persist for Days after Exposure, an article which appeared in the March/April edition of the Archives of Environmental Health and it's one I provided to you?

A. Yes, I am.

MR. CASTRILLI: Mr. Chairman, I would like to make this the next exhibit.

THE CHAIRMAN: 733.

---EXHIBIT NO. 733: Article entitled: Formaldehyde Impairs Memory, Equilibrium and Dexterity in Histology Technicians: Effects Which persist for Days after Exposure, by Kilburn, Warshaw, et al, March/April, 1987 edition of Archives of Environmental Health.

MR. CASTRILLI: Q. Dr. Ritter, is that

an article you now have?

(handed)

THE CHAIRMAN: Thanks.

MR. MARTEL: Thank you.

MR. CASTRILLI: Q. Dr. Ritter, I'm referring you to page 120 in what is now Exhibit 733.

Dr. Ritter, this was a study performed by Doctors Kilburn and Warshaw from the Environmental Sciences Laboratory at the School of Medicine, University of Southern California and the abstract, which I won't read for the moment, summarizes the article.

The paragraph I refer you to is the first paragraph, last sentence on page 120. It begins:

"However, the results described that chronic exposure to low levels of formaldehyde reduces function of the nervous system."

Do you agree with that assessment?

DR. RITTER: A. I'm not intimately familiar with the literature on formaldehyde. This is a single isolated report, to the best of my knowledge, in which a study of this kind has been done.

I would agree that the authors have concluded this from their investigation. I don't know

that I would agree that their conclusion is necessarily the only one plausible from the data.

Q. Has this been studied in Canada as a potential health problem for forestry workers, bystanders or wildlife exposed to this material?

A. I don't think it has been for the purpose of forestry workers or bystanders.

It might be -- in that context, Mr. Castrilli, you might wish to note for the Board that the study involved an examination of histology laboratory technicians.

I wonder, Mr. Chairman, if I could just digress for a moment in the interest of clarity.

Formaldehyde is an analogue, if you like of a product that we call formalin which is used to preserve and fix biological tissue, one preserves liver or kidney or what have you in formalin and it becomes very rigid and stiff and that allows you to cut varied -- through sections typically a couple of microns through that tissue which can then be examined histologically and microscopically.

So that the normal duties of a laboratory histology technician would be to sit at an imbedding tank containing formalin for seven or eight hours a day for life and the study in question was an investigation

of these kinds of workers.

So that in this particular case, Mr. Castrilli, as you will know, they are not being exposed to a parent compound which in turn may be metabolized to some 28 per cent to another compound which in turn will have some proportion of that secondary metabolite metabolized to formalin.

This is exposure to formaldehyde directly at concentrations which approach 5 parts per million for seven hours a day for years. And I'm not aware that formaldehyde could even be detected in the scenario in which we are discussing in this particular hearing, let alone I don't imagine that one could begin to contemplate how exposure for that frequency and that interval and that duration could ever take place.

Q. But it has not been studed in the context of forestry workers in this country; has it?

A. Well, we know how often forestry workers apply the product. They don't apply it every day of there life. That has been studied and we know that very clearly.

Q. They do, however, apply it "x" days per year for "x" years?

A. That's right. We are talking here, again I remind you, about laboratory technicians who

use the material and are at nose-to-nose contact with it. As you are sitting over a formalin vat - having done this for many years - one might be 14 or 15 inches from the formalin vat for seven hours a day as a career. I mean, there are laboratory technicians who do this their entire working life.

If you were asking me: Do I consider that formaldehyde may pose an occupational risk to histology technicians I think I could tell you, in my view at least, unequivocally yes.

Q. Okay. But you haven't done the work to determine whether you can make that conclusion in relation to forestry workers; have you?

A. I'm not sure what work you are referring to. I know that forestry workers are not exposed to formaldehyde every day of life for seven years.

Q. But they may be exposed to formaldehyde for "x" days for "x" years. We have just gone through this, Dr. Ritter.

A. They may be.

Q. And you haven't done a study?

A. That's correct.

Q. And there is no such study -- there have not been any studies done in Canada?

A. None that I'm aware of.

Q. All right. Is that a factor that a decision-maker charged with health protection should take into account?

A. If it constitutes a viable risk, yes. I think what I have tried to explain to you is that, in my view, it doesn't constitute a viable risk.

Q. Dr. Ritter, can you also confirm for me that technical glyphosate contains N-nitrosoglyphosate as a contaminant?

A. Some lots of the parent material have been known to contain the contaminant, yes.

Q. Actually for ease of reference, Dr. Ritter, I am again referring you to what is now Exhibit 729, the glyphosate reregistration document.

A. Yes.

Q. Sorry, page 11.

A. Yes.

Q. Under the heading N-nitrosoglyphosate, the agency there is the U.S. Environmental Protection Agency, indicates that they have determined that technical glyphosate contains N-nitrosoglyphosate which is also known as NNG as a contaminant at levels of .1 parts per million or less.

A. Yes.

Q. That is in the United States. Do you know whether that would also be true in Canada?

A. It can be true in Canada; that is, that as I indicated to you, there have been lots of glyphosate which have been identified with the contaminant at or near the level of detection.

Q. And can you confirm that most N-nitroso compounds are carcinogenic?

A. Many, yes. You may, by way of example, Mr. Castrilli, wish to note in Exhibit 723, for example, a study done by Newton, et al.

Q. We are going to come to that.

A. I was just going to say, the last sentence in the abstract notes that in this particular lot of glyphosate -- this particular lot of glyphosate, N-nitrosoglyphosate was non-detectable.

Q. We are going to come to that as well, Dr. Ritter. Let's first deal with the N-nitroso compounds.

From the vast literature on the subject, Dr. Ritter, I have plucked one document that I just would like your comments on and I have provided it to you previously.

It's by a Dr. William Lijinsky entitled: Health Problems Associated with Nitrates and

Nitrosamines?

A. Yes.

Q. I think you have a copy of that?

A. Yes, I do.

MR. CASTRILLI: Mr. Chairman, I would like to make this the next exhibit.

THE CHAIRMAN: 734.

---EXHIBIT NO. 734: Article entitled: Health Problems Associated with Nitrates and Nitrosamines by William Lijinsky.

MR. CASTRILLI: Q. And, Dr. Ritter you have that; is that right?

DR. RITTER: A. Yes, I do.

MR. CASTRILLI: (handed)

THE CHAIRMAN: Thank you.

MR. CASTRILLI: Q. Dr. Ritter, just by way of introduction, I ask you to turn to page 72 of what is now Exhibit 734.

That's a brief summary of Dr. Lijinsky's involvement in the area of chemical carcinogenesis and his involvement, in particular, with N-nitroso compounds.

Are you familiar with Dr. Lijinsky's work generally?

DR. RITTER: A. Yes, I am.

Q. He's a noted authority on this field,

in this field?

A. Yes, yes.

Q. Thank you. I ask you to turn to page 71 of that exhibit.

A. My pages here are not reproduced too well. If you can just identify the top sentence for me perhaps of the page.

Q. It would be under the heading: Carcinogenicity of N-nitroso Compounds.

A. Yes.

Q. Dr. Lijinsky indicates that:

"There seems to be no question that N-nitroso compounds comprise the most widely acting group of carcinogens known and are among the most potent."

Do you agree with that assessment?

A. Yes, do I.

Q. And he goes on to note that:

"More than 120 similar nitroso compounds have been tested for carcinogenic activity and more than 90 of them have been active."

Are you familiar with that information?

A. Yes.

Q. And do you agree with that

conclusion?

A. By and large, yes.

Q. Can you confirm for me, Dr. Ritter, that there are no acceptable studies for mutagenic and reproductive activity -- excuse me, mutagenic or reproductive effects of NNG?

A. Of NNG specifically?

Q. Yes.

A. I don't know if there are or are not at this time.

Q. Can I ask you to turn to what is Exhibit 729.

A. Yes.

Q. Page 12, keeping in mind this was a document written in June, 1986.

A. Yes.

Q. The first full paragraph on that page indicates:

"There are no acceptable studies for mutagenic or reproductive effects at present for NNG."

Now, that was the situation in the United States in June of 1986. What was the situation in Canada in August, 1989?

A. I'm not aware of the precise

situation in Canada right now. But again I would remind you, Mr. Castrilli, that the product is tested including its component contaminants, so that perhaps, at least in my view in assessing public health, I would while interested in the potential reproductive or mutagenic effects of the contaminant, I would be much more interested in the potential for those effects to express themselves in the contaminant as it is associated with the compound with which it may be present.

That is: We are not selling NNG, we are not using NNG, we are using glyphosate which may contain NNG, and glyphosate which may contain it has been tested in all of these assays which you have described.

Q. And it has been tested and found to what?

A. To the best of my knowledge, at the present time it has been tested and found to be virtually free of effects in all of the various end points that have been evaluated.

Q. So it's your view that NNG is an exception to the general rule for the N-nitroso compounds that generally cause cancer?

A. Not at all. If you recall from the

presentation that I made on the first day, I tried to impart the impression that we do not use a margin of safety approach in evaluating carcinogens, indeed we discussed that briefly during your cross-examination this evening.

It is, however, possible to have concentrations of a compound in which the concentration is so small that the risk that it creates is what we tend to refer to as diminimus; that is, that there is no level of exposure that is without an attendant risk, but the attendant risk associated with the level of exposure that one might anticipate would be so small as if it virtually did not exist.

That's what I'm trying to say, not that NNG is an exception to the rule, but rather that NNG at the concentrations in this compound are not expected to create a real human risk.

And, indeed, if you read on to the next paragraph on that very page you were reading, that's precisely the conclusion that EPA reached. If I may, they say that:

> "Because the amount of N-nitrosoglyphosate is less than one part per million, no additional toxicology data are required."

A conclusion that I would agree with.

Q. Is it a conclusion that was in fact done by Canada. This is U.S. EPA's evaluation. Did you do one yourself?

A. Oh yes.

Q. Did Health Protection Branch do one?

A. Yes.

Q. And your conclusion was the same?

A. Yes.

Q. And where is that recorded?

A. It's recorded in an internal review to the Health Protection Branch.

MS. MURPHY: Mr. Chairman...

MR. CASTRILLI: Make your objection known.

MS. MURPHY: Well, I'm not making an objection now, I am just suggesting that although Dr. Ritter may be frisky, it is ten o'clock and I would just ask that you consider finding an appropriate place to adjourn for the evening.

MR. CASTRILLI: Mr. Chairman, if we are going to entertain that suggestion, I think we are there, because the next area I am going to go in is fairly extensive.

THE CHAIRMAN: Okay. I would just like

to finish this last bit of evidence that Dr. Ritter presented.

Where is that conclusion you referred to on the next page you were talking about?

DR. RITTER: It is on page 12 of Exhibit 729. I was noting, Mr. Castrilli had asked a moment ago about the availability of certain studies on the contaminant, the NNG, and as to whether or not the NNG was a representative member of this class of chemicals in its potential to produce cancer.

I was noting that I was not trying to dismiss the potential carcinogenicity NNG, but rather again, as we have discussed before, it's a question of exposure and the concentrations at which this contaminant may be present are sufficiently small that we and the U.S. Environmental Protection Agency has noted on that second full paragraph on page 12 -- have concluded that:

> "At the concentrations at which it may be found in the glyphosate formulation, it is not expected to constitute a risk and, consequently, no further testing of any kind with regards to the contaminant is required."

And in closing, I would just ask you once

again to note that the parent compound containing the contaminant was tested. So that if the contaminant as it is associated with the parent compound was capable of producing an effect, that effect would have had ample opportunity for expression.

THE CHAIRMAN: And you're saying Canada reached the same conclusions?

DR. RITTER: Yes.

THE CHAIRMAN: And this is contained in an internal department memo?

DR. RITTER: That's correct.

THE CHAIRMAN: Thank you.

MR. CASTRILLI: Mr. Chairman, this would be an appropriate place to break for the evening.

THE CHAIRMAN: Okay, ladies and gentlemen, we will adjourn until 9:00 a.m. tomorrow morning.

Thank you.

---Whereupon the hearing adjourned at 10:00 p.m., to be reconvened on Tuesday, August 15th, 1989, commencing at 9:00 a.m.